

**FEMP First Thursday Seminar:
Water Efficiency Planning and Reporting; April 1, 2010**

Richard Kidd:

Welcome to First Thursday Seminars, a series of programs to provide education and training on critical topics to Federal, energy and environmental professionals. The Federal government is the nation's largest energy consumer, and as such has a clear responsibility to lead by example. With Executive Order 13514, the president has challenged each agency to set and meet new targets to reduce energy and water use and increase renewable energy production, with greenhouse gas reduction as our common collective metric of performance.

FEMP is here to assist our Federal customers in implementing cost effective energy management practices and smart investment decisions. We work with agencies to identify and leverage financial and technical solutions to meet and exceed our national energy goals. We anticipate that this program and the ones to follow will help you reach your energy, water and greenhouse gas reduction target. While we have selected six of the most important topics, no single one is a standalone solution.

Only an integrated whole systems approach can succeed. Please visit the FEMP website for additional resources, technical assistance and guidance. Together we can make a difference. Thanks for joining us.

Kathy Hyland:

Hello, welcome to the Department of Energy Federal Energy Management Program, First Thursday Seminars. I'm Kathy Hyland and I'll be your moderator today.

This is our course on Water Efficiency Planning and Implementation, the third in our series. If you haven't already printed the learner guide and handouts you can do so by accessing the website <http://www.femp.energy.gov/training>, or you can wait until after the seminar. They will remain up on the website.

Let me cover our objectives for today. After participating in this course you will be able to access legislation executive order requirements as they apply to water efficiency. You'll be able to determine how you're going to establish your baseline measurements to determine your current water use. You're going to understand the processes that you might use in conducting a water walk through survey. You're going to learn more and understand more about your water bill. You're going to be able to build your strategy for increasing water efficiency in your facility, including things like indoor water use, landscape irrigation, cooling towers, water reuse and leak detection.

You're going to be able to consider some various options for financing water efficiency projects and you're going to be able to discuss and plan for responses to drought and other water related emergencies. So those are our objectives for today.

Our format is simple. There'll be presentations followed by question and answer sessions and you can actually speak with the instructor live if you'd like to call in after the seminar, but there's three ways that you can ask your questions. One is to phone in and that number is on your screen, you can also fax in your questions or you can email your questions in. So we really welcome your questions and hope that you will take the time to ask them.

I'd now like to introduce you to our instructor today, Kate McMordie Stoughton. Kate is a Water Resources Engineer at the Pacific Northwest National Laboratory where she specializes in Federal Water Management.

Kate leads the team at PNNL that works in the area of water efficiency and she also supports the Federal Energy Management Program in the area of Water Efficiency. So welcome, Kate.

Kate McMordie Stoughton:

Thank you.

Kathy Hyland:

We also have with us in Washington, D.C., Will Lintner, who is an expert in water efficiency, and I'll introduce him more later, but he will be a subject matter expert to answer questions as well today.

All right, Kate, at this time I'm going to turn it over to you.

Kate McMordie Stoughton: Thank you, Kathy. I am so pleased to be here today. I have been really looking forward to presenting the seminar on water efficiency. And what I'm planning to do today is to discuss the strategy for implementing water management. Today is going to allow you to have a nice foundation for understanding an overview of water management.

One of the things that I have seen in the Federal industry for energy management is that a lot of times the energy manager is also the water manager and that person is typically an energy person.

What I'm really hoping today is that for the folks out there at the site level and at the agency level who are more energy people, they can really get a broader understanding of water management and how it's a little bit different than energy management.

Before I really jump into the seminar I want to go over just a few terms so that we can understand them. I want to talk a little bit about conservation versus efficiency. They're actually used interchangeably often and I do it myself. I probably will do it today but conservation for me is a little bit different than efficiency, and conservation for me is more about how the end-user uses the specific technology or process.

Conservation is more about scaling back, taking shorter showers, not watering your lawn as much. This photo here is showing a brown lawn. This particular homeowner has conserved water by reducing their water use in their lawn.

Efficiency is more about the technology or the process working more efficiently but generating the same result. There's a picture here of a thriving plant with water being delivered in a more efficient way.

An effective water management plan includes both. You have to have conservation and efficiency, but today we're going to be really talking more about efficiency rather than conservation. I just wanted to clarify that a little bit.

Now, another thing I want to clarify is the difference between potable and non-potable. This is becoming more important, especially with the new executive order. I'm going to be getting into a lot of details on that in just a little bit here. But I wanted to define potable and non-potable.

Potable is simply just clean enough to drink, that's what potable water means. And it's of sufficient quality and permitted, which is key, for human consumption. Non-potable is really just the opposite of that. It means it's not of sufficient quality for human consumption.

There is maybe some non-potable water that is clean enough to drink, that you could have a well that the water coming out of is clean enough, for example, but it's not permitted, so that I wanted to distinguish between the two.

What I hear sometimes is that people think, "Oh, the only thing I need to save is my potable water." Well, things are changing. We're going to be talking about how changes are coming through the executive order, mainly, but it's important for us to think about managing both potable and non-potable water.

Many sites in the Federal government have both these water sources, and some examples of non-potable water may be irrigation or make up water for your cooling tower, some may even include flushing toilets and urinals. We're going to be talking about some more of these specific strategies later on.

I've gotten a few terms out of the way. Now we're going to jump into the bulk of our seminar today, and this graphic illustrates some of the key things that I'll be discussing today and it's essentially the four main steps in developing a water management plan.

The icons that you see are repeated throughout the seminar as a little reminder, it sets a little context for the material I'll be covering. So the first step is where are you coming from? It's the first stage; it's the first step of setting your plan, pulling everything together.

The second step is that pie chart you see there, where are you now? That step is about understanding your current situation and the pie chart represents a lot of the data that's going to be pulled together in this plan and representing the data that you collect in something like a pie chart. So I'll talk about that more in a little bit.

The third step is where are you going and how are you going to get there? This is really the crux of developing the efficiency opportunities, and the magnifying glass represents the investigative nature of this step. This is where you investigate and find your efficiency improvements.

And then the last step is what do you do if you have a drought? What do you do if you have some type of supply constraint? The last step is about contingency planning, and that water drop is kind of representing a water shortage of some type and we'll be talking a little bit about that step as well today.

The first step, where are we coming from? This step is really about setting your foundations, setting your plan, getting your goals put together. And one of the most important parts of this step is developing your team. I am honored and lucky enough to be working with Y-12, which is a large DOE plant, helping them perform a water assessment.

And one of the very first things we did was we had a kickoff meeting at Y-12. We were in a conference room with about 30 people and these folks were from many different areas of the Y-12 organization. We had environmental people, we had energy people, we had operations and maintenance, we had a cooling tower specialist, we had plant people. My point here is it's important to pull a lot of different people in when you're starting your water management plan.

It's a little bit different than energy because water really bridges into the environmental side of the house more than energy. So make sure that you assess who you need to talk to and pull that team together.

Another important part of this step is identifying your goals and your requirements, and we're going to be getting into the requirements in a second. You need a stated goal, and the goal may be just simply that you want to meet the executive order and the EPA requirements. But you might have a site specific goal. You might have a problem in your water infrastructure that you want to solve. Make sure that your goals are really tailored to what you need.

Also, this is where you're going to be setting your study period. I suggest at least one year, but you might need to look back a little farther. There might be other things you think about in this step like picking your unit of measure. I know that sounds like a really simple thing, but it's so important that the whole team understands the unit of measure that you're working in. It will probably be thousand gallons but you may have other units that you work in, maybe depending on how your utility bills you. So these are some of the things that you want to think about.

A really important part of this step is understanding the requirements that the Federal government has. This graphic here shows some key legislative and executive orders that revolve around water reduction and water efficiency. I'm going to go over them very quickly but there is a lot of information in your Learner's Guide on this – EPA of 2005 is also in your Learner's Guide. So you might want to check out your Learner's Guide, because I'll be going over it fairly quickly.

The first thing I want to mention is Executive Order 13423. It has not been superseded by the new executive order, which is an important distinction. Executive Order 13423 is a two percent reduction in water use intensity, which is water use per square foot. And that square footage is the same square footage for your facility square feet for your energy reduction. That's an important thing to understand.

Executive Order 13423 really revolves around potable water use intensity reduction, two percent per year through FY 2015 based on a 2007 baseline.

Okay, so I'm going to jump forward now to Executive Order 13514. This extends Executive Order 13423. I'm not going to get into that right now, but think of it as an expansion and extension of the previous executive order.

Then we also have EISA. EISA stands for the Energy Independence and Security Act. It has numerous things that was signed in 2007, but I want to point out one thing in particular. There's a requirement for 25 percent of your facilities to be evaluated every year. So every four years, you essentially have gone through all your facilities.

And it's for energy and water, it includes both, and it's very distinct that it includes both energy and water measures. What I see in the field is that often these EISA evaluations look at energy and then they might look at a couple restrooms and people are calling it good. "Okay, we did our water side of this EISA requirement."

Well, today what I'm going to do is really show you that it's much more than going through a couple of your restrooms, that you can hit much broader categories in your water use applications and processes to meet this goal.

I'm going to jump into a really important thing today and I bet there's a lot of questions out there about the new Executive Order 13514 so I'm going to go over some of the basics and then we're going to jump into some specifics.

Remember that 13423 had the two percent reduction for water use intensity for potable water. Now it's been that same goal – that two percent reduction has been expanded to FY 2020. So essentially it's a 26 percent reduction for all Federal agencies have to meet that by FY 2020, have a 26 percent reduction in their potable water use intensity and that's important.

Do you see a new acronym? I hate to throw a new acronym at you because you guys are flooded with all these acronyms. There's a new acronym, it's called ILA. And I actually think it has a nice ring to it. It stands for Industrial, Landscaping, and Agriculture. It's a lot easier to say ILA and to type ILA on the screen than to say industrial, landscaping, and agriculture, but there is now a two percent reduction requirement for this ILA. This industrial, landscaping, and agricultural water use starting now, starting FY 2010. This is the baseline year, all the way through FY 2020.

This is a distinct change. It gets into that non-potable water use. We're going to get in on that a little bit more in the next slide. I'm going to jump to the next provision. There's a third provision in this executive order. It is to implement water reuse strategies. Now there's not quantifiable goals for this one, it's more of an encouragement to do water reuse strategies, but I think it's important to try to meet this goal because water reuse is a huge area of reduction potential.

I'm going to have a few slides on this later, towards the end of our seminar. So I'm not going to talk about it now, but just wait for a little bit and we're going to actually go into it in a fair amount of detail today. The last thing in the executive order revolving around water is the requirement for all Federal agencies to follow the EPA storm water guidance. I'm going to give you a website for that in just a little bit. Okay, so let's get into this ILA water use.

Again, ILA stands for Industrial, landscaping, and agricultural water use. Now let me back up a second. The water working group is a collaborative group of Federal agencies. It's chaired by FEMP. The water working group comes together and has a mission to help analyze policy, interpret different requirements for Federal government, look at new and emerging technologies. The water working group recently came together and wrote a draft proposed guidance for the water provisions in the executive order. It is not final yet, so it has not been posted on the FEMP website.

It should be final fairly soon, so you can go onto the water efficiency website on the FEMP website and find a link to the guidance once it's final. And it will – like I said – be coming out fairly soon. But in the proposed guidance, what the water working group did was define what this ILA water use is, this industrial, landscaping and agriculture, and this table here shows you some basic definitions.

Industrial is water that's used in the aid of processes such as washing, cooling and manufacturing. That's a broad definition. Landscaping is water used in the application for a socio and behavioral and aesthetic landscape – plants. So this would be landscaping around facilities, recreation fields, athletic fields, that kind of thing. And then there's also agricultural water use that's in this new executive order, and that is water used related to any kind of agricultural crop irrigation, livestock operations and agricultural research.

Again, those are the definitions that are on this proposed guidance. Some things that I want to distinguish for this water reduction for the industrial, landscaping and agriculture – it's two percent volumetric reduction. That means the total volume has to be reduced every year by two percent. It's different than the first provision of this executive order which is a two percent reduction in water use intensity. Which means it is gallons per square foot. This is total volumetric reduction of your industrial, landscaping and agricultural.

Each agency has to combine that number and that's what's reported to the Department of Energy every year. It's a total amount for that ILA water use. So one of the key things in this guidance that the water working group pulled together is the – let me back up here for a second. There was some concern that the ILA water use was going to create a redundant reporting because many agencies are already tracking their irrigation and landscaping, but that's for potable water use.

If there are other uses that meet that ILA definition – that meet the definition of industrial, landscaping, and agriculture, that isn't currently tracked in your FY 2007 baseline, then it falls under this new one. So again, that helps to reduce the redundant reporting, and also re-baselining. You don't have to start switching over your irrigation use that you're tracking in your FY 2007 – you don't have to switch it to your FY 2010.

I think that's a really important distinction. Agencies don't have to re-baseline and they shouldn't have redundant reporting where you're counting something twice. So I hope that's clear. If it's not, again, the guidance will be coming out very soon and it will provide a lot of clarifications and there also will be some time for Q and A. All right, I need to move on.

The storm water guidance is out on the web. The website here is the EPA site and there's a really nice fact sheet that the EPA wrote that is a condensed version of the guidance, so that might be a good starting place. The crux of the storm water guidance is the reduction of runoff and to retain water on site. That's kind of the crux of it. We don't have time to get into it today, I apologize for that, but this website should be a really good starting place for you to understand what those requirements are.

One last thing I wanted to mention in this step here is the fairly new organization called The Alliance for Water Efficiency. It is an incredible source of information for folks who want to learn more about water management. One of the things that they've recently developed is this really neat map site and you can click on your state and it will bring up a lot of information about your local and state and county regulations that revolve around water management and water conservation.

I highly recommend if you want to look a little bit more into your particular state requirements, go to this website and surf on The Alliance for Water Efficiency. I'm going to quote them all over the place today. They're an incredible source of information.

Now we're ready to get into the second step. Where are you now? This question is really revolving that you need to understand what you're currently using. You can't improve what you don't know. That old adage, you gotta measure it to master it – you have to understand it before you can move

on to your efficiency ideas. I wanted to introduce you to this idea of a facility water cycle. A lot of us have heard about the hydrological cycle. This is kind of like that.

This is really the crux of this step. You want to start tracking your water from the very beginning all the way to the discharge. You see that little potable water icon there, the glass of drinking water? Well, I hope you can imagine that there also – you should also be tracking it for non-potable. Think about this water cycle, that it is going to be for all your potable water sources and also your non-potable as well.

An important thing to understand is the idea of a water balance. You know the old adage what goes up must come down? Well, for this one it's what goes in must come out. So water balance is really looking at what's coming into your site – how are you using it, and seeing if those balance, okay? So we're going to be talking about that so just put those two visual images in your brain.

Think about the water cycle and this water balance because we're going to be coming back to that image throughout this step. The first really important aspect of this step is to collect data. I want to distinguish really quickly that – during this part of the water management planning process, you are at your desk. You haven't gone into the field yet. You're collecting a lot of data, you're making phone calls, you're doing a lot of emailing, so you're collecting a lot of good information.

There's some additional information in your Learner's Guide in this particular slide that will give you a little bit more background on what you should be collecting, but the important thing to think about here is to contact your utility that's serving your water – so it might be a local municipality, many city governments provide water – so you'd be contacting your water utility and collecting data for at least one year if not – if possible - more than one year. You also want to make sure you get wastewater information as well, so water and wastewater.

If you are buying potable and non-potable water from your local municipality, get both of those data sets. Make sure that you're tracking both because that's in the new executive order; you have to start tracking both. If you generate your water on site, you can get information from the folks that produce the water on site. You'd have to collect it from on site sources. Again there's more information in your Learner's Guide on that.

Another important aspect of collecting this step and collecting background information is getting your hands on as much data as you possibly can. I'll give you an example – Y-12, they were incredible. The folks at Y-12 provided us a lot of great data. One of the key pieces of information they sent us was a detailed inventory list. It had every single building on Y-12's site with their square footage and the age of the building. What that provided us is a really nice map to help us prioritize what buildings we hit first. So building an inventory is key.

Another really good thing to get in this step is occupancy levels. If you can get information on how many people are in the building, that's important. Water is really driven – well I shouldn't say 100 percent, but a lot of water is driven by who's in the building, not how big the building is. So it's important to understand who's in the building.

You also might want to get information on your meters, operating schedules – I won't go over every single one of these items on the list in detail, but there's a lot of information you can, again, collect at your desk.

What goes in must come out. This chart represents what goes in. At this point, again, you're still at your desk, you've collected information from your local utility, you've provided information for at least one year. And this chart is made up data – I never see charts this smooth; they're usually all jagged with big spikes in water use.

This one just has a nice little bell curve that shows water use over a year as you'll probably notice that it kind of ramps up in the spring and peaks out in the summer and goes back down in the fall. This would show that you have a big water demand in the summer for cooling and irrigation.

This chart shows your total supply. This might be five different supplies added up together, it might be one. But again, this would be for potable or non-potable, you don't want to combine the two, you want to have two separate charts for each type of water source that you are procuring or generating.

Now we have a feel for what's coming in. The next step is how we are using it. This is still at your desktop. You are going to be collecting as much information on your big water users that you can. This will be mainly sub-metered data. It'll be data on metered buildings, metered processes; maybe your cooling tower has a meter on it. Maybe you have a big golf course that has a meter.

You want to collect as much information on your sub-meters. Again, this is past the master meter. You've already got that data, now you're digging in a little bit deeper. You also want to think about some of your really big water users that may not be metered at this point.

You may have a big construction site that's doing dust suppression and you can estimate that. There's a methodology in your Learner's Guide that gives you a brief outline on how to estimate un-metered uses. That might be a little bit helpful.

You may have a storm main flushing; you might have fire fighting drills that you know about. You want to start to get a feel for some of those big uses that you know about where you can start to estimate uses based on the operating schedule and flow rate and that kind of thing. Again, there's an example in your Learner's Guide that can show you how to do that.

Another important aspect is estimating your losses, and this table shows some different types of losses. There are two main types. There are real losses which are leaks. This is the physical escape of water from your infrastructure. It's mainly in your distribution lines, but it also could be at the building level. Then there are also what we call paper leaks, or paper losses, and those are accounting errors.

It may be that a meter is being read wrong; it may be a unit conversion problem. This is the step where you are starting to understand and make sure that there aren't accounting problems. It might be reviewing billing data; it might be reviewing meter reading data to try to start to understand some of your losses. This would be an estimate at this point.

You probably haven't hired a leak detection team, but we're going to be getting to that towards the end of our seminar today.

Do you remember the slide that had the total water coming in? Well, that's still there. It's that top black line. That's the total supply coming in and what we've done here is we've added all the data that we've collected from the metered, un-metered and estimated losses. I'm just going to build this chart from the bottom up.

That bottom line says, "Distribution system leaks," and if you notice it's a flat line. That means it's a constant 24/7 leak. This is an estimate at this point. This is maybe based on some information that you've gotten from your utility team.

If you don't know what it is, it's usually ranged between 10 and 20 percent. Ten percent is actually for a large campus, it's a pretty tight system, 20 percent is probably about average. Big municipalities, if they can get it within 10 to 20 percent they're doing pretty good at that leak rate.

You then want to chart your un-metered uses over the year and your metered uses over the year. If you notice that blue strip at the top of this chart is "unknown." That's water that you don't know about yet. It's water that you haven't discovered. The bigger gap you have between the very top line, which is your supply, and the gap – between those two are your unknown water, and you want that as thin as possible.

If it's a huge amount it means that there is a lot of water using pieces of equipment and processes that you have not quantified yet. We're going to be getting into that in just a second.

I want to bring us back to this water cycle. What do we do now? What we've done is quantified the water coming in at the water utility, at the supply. We started to get a feel for some of those big uses but now it's a really important step to go a little farther to the end-use or to the process and application that actually uses the water.

I want to talk about some typical end-uses for office buildings and hospitals. This pie chart is for typical water use at an office building and comes from a report through the AWWA research foundation called the Commercial and Institutional End-Uses of Water. This was a study that actually did end-use analysis on building types. It's a really nice report to fall back on to look at what does an office typically use for water. What type of processes typically use water at an office building.

This is showing that domestic fixtures are the predominant users. Cooling and heating is very significant, as well as landscaping. Now, again, this is just typical. This isn't going to be for every single office building, but it can give you an idea.

Now, let's look at hospitals and see how it changes. This is the same study; the hospitals show that domestic plumbing fixtures are significant. That makes sense, right? It's a 24/7 operation, lots of people using showers and the restrooms. The cooling and heating is also significant, but the big difference here is process load. There's a lot of water used in hospitals that are lab equipment, and we're going to actually be talking about that today a little later.

The reason I'm showing you these two slides is to show you the difference between two distinct building types. You remember when I said that one piece of information is important to get when you're getting started on your water plan is to look at your inventory data. Well, if you have pie charts for distinct building types, you can start to get a feel for what your big end-users are, right? If you have a lot of office buildings you know that you probably have a lot of plumbing water use in your toilets and urinals and faucets, lavatory faucets. This is at your desktop starting to get a feel for where your big end-users are.

The next step is getting up from your desk and getting out into the field. There are some great industry experts in this area that can do this kind of thing but you can build the capability within your team as well. This step is about getting up and starting to walk through the building and to get an idea of the equipment that are using water and to be able to quantify that water use.

The goal here is to estimate your end uses. There's some specific things that you need to do during a walk through audit. Unfortunately we don't have time today to go through every single step, but I want to give you a basic feel for it. One of the things is start to get an idea of your gender split, and you might be asking, "Why would I need to know the women and men split in the building?"

Well, women and men use water differently. Women tend to use a little more water because women don't have urinals in the restroom. So it's important to understand the split between men and women during a walk-through survey.

Also, of course, try to find all the water using equipment. I'm going to show you some examples here in a second. I'm going to go ahead and jump to the next slide because one of the things that I want to mention here is the key things you collect during a water walk-through survey. You want to get the equipment age, the condition of the equipment, note how it's being maintained.

You want to record the flow rate if you can. And one of the methods you can use to measure flow rate, I have a picture here in the slide, and it's a flow bag which is a graded plastic bag that if you hold it under a faucet or shower, it could be in a kitchen application, for five seconds, it will give you the gallon per minute rate. These are readily available and very inexpensive and it's something that I use a lot in my walk-through surveys.

You want to measure the flow rate if you can. Some applications you can't measure might be flowing too high. But there are ways to get that flow rate by noting the model number of the

particular piece of equipment. You can get a lot of information from model numbers. If there is a model number on the process equipment, make sure you get that, and also understand the operating schedule. You'll probably have to interview the folks that maintain that piece of equipment to understand how often they use it. That's really important.

All those pieces of information will help you estimate how much water is being used by that process or fixture. Again, there's an example in your Learner's Guide on that.

The type of equipment that you want to look for, I have it listed here. We're not going to go over them individually because I'm actually going to be hitting on all these in the third step of our water management process. But you want to make sure that you go beyond the restroom. You want to get into your boiler room, you want to look at your cooling towers, make sure you understand your irrigation. You may have a vehicle water station, you may have laundry, and kitchens are huge users of water and energy. You want to talk through your kitchen.

Not only are you going to be looking for estimating your current water use but this is a time also to start getting an eye for efficiency improvements. You want to make sure that you talk to the maintenance staff and other team members because they may have ideas for efficiency improvements, or they may be able to key you in on some of the things that they need, some piece of equipment that's about to fail that would be a perfect opportunity for replacement with an efficient piece.

All right, so I'm back here to this water balance image. Remember, what goes in must come out. We're at the point where we have looked at what comes in, we've estimated what comes out, so we're really close to having that water balance quantified.

What the quantification of that water balance is is really the sum of all those uses that you just combined. It's adding them all up, make sure your units are consistent because you don't want to be adding up gallons and liters, but you would be adding up all your uses and you make sure you're not double counting. If you remember, you also collected a lot of data on your meter uses. You may have buildings that are metered, process cooling towers that are metered. Maybe sure that you're not double counting, but add up all of those pieces of equipment and then compare it to your total and see how close you can get.

If there's a huge gap it means that you've probably forgotten something or you have a lot of leaks, so that's a really nice process to get a feel for how you're using your water now.

This pie chart here is a visual that I always like to have in a water management plant, because pie charts are just so easy to quickly understand what's going on. This is not made up, I didn't make this one up, this is a real piece of data. It's PNNL, Pacific Northwest National Laboratories, water balance that we developed back in about 2000.

This showed that laboratory water use is by far three-quarters of the water used at the lab back about 10 years use, and this was mainly single pass cooling. What we discovered was that toilets weren't the big hitter, it was laboratory equipment, and this is just to highlight the importance of doing this. If you don't do this you may think that toilets are your biggest user. This is an important step.

And I think with that, are we ready for a break.

Kathy Hyland:

We are, Kate.

We want to take a minute or two and hear some comments from Will Lintner. Let me give you an introduction to Will. Will is with the Federal Energy Management Program where he facilitates energy efficiency, water and renewable energy technology programs and works in the area of sustainable best practices.

Will has been recognized by the Department of Energy for his contributions to reducing DOE's own operating cost by over \$100 million a year through energy efficiency retrofit projects.

Will is also the winner of the 2007 Presidential Award in Leadership in Federal Energy Management for his contributions to joint DOE, EPA Laboratories of the 21st Century program. Let's hear from Will.

Will Lintner:

Water is a precious resource. Although 71 percent of the earth is covered by water only 1 percent of that water supports human life and many of our water supplies are becoming more critical than ever before.

Hello, I'm Will Lintner, an Energy Engineer for the Department of Energy's Federal Energy Management Program. Water is now an integral part of a comprehensive and sustainable approach to Federal facility management.

Water use affects energy use both directly and indirectly. Large amounts of water is used to produce the electricity we purchase and a significant amount of energy is used in the pumping and treatment of water.

The challenge for Federal agencies is to determine the most cost-effective ways to increase the efficient use of water within their facility operations. Recently Executive Order 13514 provided Federal agencies with aggressive annual and cumulative water reduction targets. The new order also requires accelerated efforts to meet water reuse and storm water management goals.

FEMP leads a Federal Water Working Group. The group meets regularly to share implementation strategies and lessons learned while complying with the provisions of Executive Orders 13423 and 13514. When needed, this group provides information, policy, and guidance to coordinate Federal water efficiency efforts. The group also provides agencies with a forum to discuss promising technologies and processes and reporting changes to affect real water savings.

Energy is needed to treat, pump, heat and process many different water use applications. To assist agencies with identifying improvements to their water use, FEMP worked with EPA to produce a series of 14 best management practices and related case studies.

The best management practices create blueprints for the establishment of water treatment programs and the case studies provide real world examples of success. Some of the examples of topics included in the best management practices are planning, awareness programs, leak detection and repair, indoor domestic applications, and water irrigation and landscape practices. They are a wonderful resource.

Whether you're establishing new baselines and strategic action plans or implementing a water efficiency program FEMP has resources for you. Visit the FEMP website to find the best water management resources to fit your needs.

I look forward to answering your questions later in this program.

Kathy Hyland:

Okay, back to Kate.

Kate McMordie Stoughton:

Thanks, Kathy. We're still in that second step – where are you now. After really understanding how you're using your water you also want to understand what you pay for your water - your water costs. I have some examples of rate structures here because water is not as complicated as your energy bill, but there are different ways that a utility may be charging you for water.

There are also things that you need to know on your water bill, so it's important to get the collection of water bills and really analyze them. You may have some meter fees, service fees, your billing periods may not be over a perfect month, they may be 29 days or 32 days, and that's

really important when developing that chart. You have to make sure that you understand what the billing periods are.

You also have to make sure you understand your wastewater or sewer charges. A lot of times folks forget that that can be a significant fee. In fact, Y-12's wastewater is seven times more than their potable water. The big cost reduction opportunities for Y-12 will be in anything that can reduce wastewater. It's important to understand both water and wastewater.

I want to talk a bit about some example rate structures. This chart here is a nice visual that demonstrates what these represent. Flat is that it's the same no matter how much you use. This is an example, I put these together, this is completely made up, but it's just, again, to illustrate these different kinds of rate structures.

The declining rate structure is a rate structure that the more you use, the less they charge you. It essentially benefits the big industrial users that might be very predominant water users in a community, they would get a lower rate, and that's actually quite common for water. Then there's one that's becoming more popular, especially in drought ridden areas. That's an inclining rate structure, and that's where the more you use the more you pay. It really rewards conservation.

I want to talk a bit about marginal costs of water. Your marginal cost of water is something very important to understand. You can't take your total water bill, the total cost, and divide it by the gallons to get your cost per gallon. That's because, again, there are meter charges rolled in, you might have a rate structure that is like a declining or inclining rate structure, so it's very important so that you, again, analyze your bill and understand what your rate structure is so that when you look at your economics of your efficiency improvements you use the right rate.

I'm going to give you a quick example; it's written out in more detail in your Learner's Guide, so you might want to check out the Learner's Guide to see the exact calculation. What this example is showing is that you might be hitting two different blocks of rate in one project. If you have a big reduction, you go from the \$4.00 per thousand gallon block to a \$3.00 per thousand gallon block. You would have to use both charges, rates, in the same project. Now, I know it might be a little bit confusing and that's why we have it in the Learner's Guide.

Make sure that you really get a feel for what your rate structure is so that when you do your economics you're applying the right rate for those reductions.

There are also other costs, of course, associated with your water projects that you might want to start getting a handle on in this step. Oftentimes there are synergies with water and energy where when you reduce water you're going to reduce energy. Kitchens are a perfect example of that. Make sure you have a good feel for your energy charges, too.

There may be treatment and chemical cost reductions. There's also maybe operational and maintenance cost changes, and there sometimes can be trade-offs where with a water project you might have an increase in another cost, like an operations and maintenance cost or sometimes even in energy there can be a trade-off for air cooled versus energy cooled machines. It's an important thing to start to develop or start to understand these types of costs as well.

We're now ready to get into the third step, and this is really the fun step. This is where you're starting to form your efficiency improvements. Again, that magnifying glass signifies that this is the investigative step. You're looking at all the opportunities that you can to decrease your water use so you can meet the reduction goals.

I wanted to bring back this chart that PNNL developed for their water plan about 10 years ago. Again, this is helping to focus in on what the biggest user is for the lab so that we were able to form a good plan. What happened around 2000 is that the single pass cooling systems began to be closed down and put on a closed loop system. As you change your water use, this pie chart will change. Again, it's this indication of where your biggest users are.

The first step is to identify your biggest opportunity for savings and then you start getting ideas. I know what the biggest user is, what am I going to do to help decrease the – or improve the efficiency? Here's a listing of some examples of the best management practices. There's 14 in all, Will just mention them in the break that we had. If you go out on the FEMP website you'll find one best management practice link for each area. These are distinct processes and applications and pieces of equipment. It's about a page and a half on each BMP and it's a good starting place. It has a good overview of some of the operations and maintenance changes, some of the efficiency replacements and retrofit opportunities that you might have. It also has links where you can get more information.

Now, I want to go into some of these BMPs for you and talk a little bit about them. I'm going to start with indoor efficiency with some of the plumbing fixtures and I want to introduce another new acronym, it's called a HET, or a High Efficiency Toilet. I think it's really neat that toilets got their own acronym.

An HET is a toilet that uses no more than 1.28 gallons per flush. I also want to introduce to you a fairly new labeling program through the Environmental Protection Agency called WaterSense. You'll see the WaterSense label there on the slide. This is very similar to ENERGY STAR. WaterSense is starting to label products and you'll see those products out in the marketplace. If you go to Home Depot you can find WaterSense toilets.

EPA has a label program for tank toilets, this is more of the residential application, a traditional tank toilet is a gravity fed toilet, it's probably what most of us have in our homes, but I also have listed here a couple other types of toilets as well, a pressure assisted toilet and dual flush toilet.

Pressure assist toilet has a chamber inside the tank that flushes at a higher flush – it's a more powerful flush. Dual flush has two different flushing options. It has smaller flush for liquid and a full flush, which is 1.6 gallons per flush, for solids, and so the combined – the effective flush rate for a dual flush toilet is, again, that 1.28 gallons per flush.

We also have an HET, a high efficiency toilet, flush valve toilets on the market, too. Now, these are not WaterSense labeled toilets, but HET flush valve toilets are rated at 1.28 gallons per flush and they are in the market and have been showing good performance as well.

I'm going to talk about the performance of toilets, too, because it's very important to understand. There's been some great testing out there for both tank toilets and flushometer, or flush valve toilets, and it's through this program called Maximum Performance Testing, or the MAP testing. I put a website out here where you can go and download the actual report. There's also a great website that I will be putting up on the FEMP website, that is more of an interactive website that allows you to search for different types of toilets, but the MAP testing it rates toilets on how well they flush, and it's based on how much solids can be flushed through the toilet.

It has been really instrumental in helping the industry improve and also helping the consumer pick good toilets. I highly recommend before you go out and do a specification for toilets or you go and do a new retrofit or replacement program to look at the MAP testing and look at the performance results.

I also want to clarify a little bit about what high efficiency toilet really is. It's not the standard 1.6 gallons per flush toilet. I think a lot of people still think the 1.6 gallon per flush toilet is the most efficient toilet we have on the market and it just isn't true anymore. The nomenclature that I'm using now for toilets is standard and high efficiency.

The standard toilet is 1.6 gallon per flush; it's the maximum amount that you can buy on the market today. There are much more inefficient toilets out there, too. There are 3.5 and 5 gallons per flush as well. They are huge water hogs toilets out on the market, but the standard toilets now for any kind of new retrofit is 1.6. A high efficiency toilet has to meet 1.28 gallons per flush. I want to make that clarification because I think there's some confusion about that.

On a similar note, urinals also have a designation, a high efficiency urinal designation, or HEU. Now, a standard urinal is 1.0 gallons per flush, that's the maximum that you can buy on the market today. Those are really not considered efficient. If you want to put an efficient urinal in, you have to go a half a gallon or less. What's considered a high efficiency urinal is a half a gallon per flush or less, and there are now even pint urinals on the market for flushing urinals.

WaterSense has recently specified and is starting to label high efficiency flushing urinals. Any urinal that flushes less than a half a gallon per flush is being considered for this WaterSense label. You very soon will be seeing WaterSense labeled flushing urinals.

We also have non-water using urinals on the market. I'm not going to get into the specifics of the no water urinal, but they can be appropriate for certain applications and they have been used in the Federal sector for quite some time.

If you want to get more information on the WaterSense urinals, or WaterSense products, I've put the URL there so you can go out and get some more information on the flushing urinal label for WaterSense.

A couple more plumbing fixtures I want to go over briefly are faucets and showerheads. Faucets have been labeled by WaterSense for private lavatory faucets, and I want to distinguish between public and private. I also see confusion around that a bit.

Public lavatory faucets are those faucets that you'd probably find in an office building, for example. To meet the uniform plumbing code for lavatory faucets in a public setting is a half a gallon a minute. If you're doing any major renovation or retrofit program or new construction your lavatory faucets in your public restrooms should be a half a gallon a minute. I see that a lot of people don't know that. That's very low flow rate, very efficient.

If you have a private restroom project like a hospital, barracks, family housing, that kind of thing, you don't have to meet that half a gallon a minute. The uniform plumbing code is 2.2 gallons per minute at 60 psi. But the WaterSense labeled products are no more than 1-1/2 gallons per minute, and you can go on the WaterSense website and find those faucets that meet that requirement.

Showerheads have just recently been specified by WaterSense. We've been waiting for this, so we're really excited that they have come out with this new specification. It's showerheads that use no more than 2 gallons a minute. What's really neat about this is it also includes performance measurement. It's not just about the flow rate but it's also about the performance of the shower.

You can go onto the WaterSense website and find really good information on how they've determined the performance rating and the specification for the showerheads. If you're doing a major restroom retrofit, make sure that you check into the WaterSense labeled products.

All right, big water users are kitchens. So if you have a cafeteria, a commercial kitchen, at your facility make sure that you understand what type of equipment is in your facility.

I've listed some of the efficiency opportunities that you can lean on for ideas when you're looking at replacing equipment. One of the ways to get started is go to ENERGY STAR. It's very similar to WaterSense; ENERGY STAR has great products that bridge water and energy. So ENERGY STAR rated dishwashers and warewashers are a really good place to start.

There are some systems that actually recycle water. They take the last rinse cycle and reuse it in the next cycle. So there are some very efficient products on the market.

I want to talk specifically about connection with food steamers. Food steamers can be huge water and energy hogs. These old systems are called boiler-based systems and are systems that bring in steam to cook the food and then the steam is dumped to the drain. But you can't dump hot steam into your sewer line, it's against code. You have to temper that steam with potable water to cool it

off. They are huge water wasters, and they waste a lot of energy, too, because you're putting all that hot water down the drain.

A fairly new type of system is called a connectionless food steamer. A reservoir in the bottom of this unit recycles the steam. It doesn't have a constant dumping of the steam. I highly recommend if you have boiled-based steamers to look at connectionless food steamers.

I also want to mention that air cooled ice machines are almost exclusively the way to go with ice machines. Water cooled machines can often be single pass cooling machines. We'll talk about that a little bit later. ENERGY STAR has rated ice machines and they exclusively rate air cooled. So air cooled ice machines are almost always the way to go.

Also, don't forget about food disposals. A lot of times people forget that food disposals can be big water users, and there are some very efficient systems that can – there are retrofit kits that can be adapted to food disposals to help limit the amount of water used.

A lot of times it will just run all the time, the water will be going constantly when it's not even in use. There are some good systems out there that can reduce that water use.

I also want to mention pre-rinse spray valves; it's the levered fixture that bumps off the food that removes a lot of the big food chunks before it gets put into the dishwasher. These pre-rinse spray valves have a FEMP designated product in the product specification website, and it's for no more than 1.25 gallons per minute.

Now, I want to mention that WaterSense also is starting the process of specifying pre-rinse spray valves and, I believe, that it's going to be rated at 1.3 gallons per minute. It's not a big difference but it's a little bit, and I think likely all of the FEMP products will reflect the WaterSense products. But for now there is a FEMP designated purchasing spec for pre-rinse spray valves that you can find on the website.

All right, landscape and irrigation is a huge source of water use at a site. Landscape is mainly related to the maintenance of plants, and irrigation is mainly related to how water is applied to the plants. And I put some ideas here for you. If you go to the Learner's Guide there's some nice websites where you can get more information on each one of these.

WaterSense has a labeled program that specifies the WaterSense certified professional that has taken a WaterSense certified program. If you work with a WaterSense certified professional, then you're assured that that person has expertise in water efficiency for landscape and irrigation. Consider that when looking at efficiency opportunities.

You also might want to consider working with a certified irrigation auditor, and this would go back to the second step of understanding your water use. You may have a huge amount of irrigation at your site and I highly recommend doing a thorough irrigation audit. There is a system that has been developed by the irrigation association to certify folks to be auditors of irrigation systems. It's a great way to understand how effective your landscape irrigation is. The Alliance for Water Efficiency has incredible resources.

We have a case study out on the web that was developed for Pacific Northwest National Laboratories Landscape Management Program. It is a wonderful representation of being able to do both landscape maintenance and irrigation efficiency, looking at both how the plants are maintained and how the water is being applied to those plants. You might get some good ideas in that case study. I highly recommend reading that case study. We don't have time to go over the details today on the specific strategies, but there's a lot of good resources for you.

Cooling towers can also be a big user of water. Cooling towers are designed to use water. They take warm water from a chiller system and cool it down through the heat evaporation. Essentially the water is sprayed, a fan blows over those water droplets and it cools down the water which is sent back through the system.

There is a certain amount of build up that happens when the water is evaporated. There can be solids that build up in the system that cause scale and erosion, really bad for your system. That water has to be purged, or blown down, and then you have to make up that water with fresh water.

That make up water is really what can be managed so that you can reduce your blow down, which would reduce your make up water. Some of the examples of some innovative strategies are listed here on this slide.

There's now in the market green chemicals, and green chemicals are safer for the handler and safer for the environment, but they help to reduce scale and corrosion in the system. There's also, of course, traditional conventional chemical management as well. These green chemicals are an alternative to the conventional chemical treatment.

There are also chemical free platforms that are on the market that are becoming a little more popular, a little more studied as well. There are different opportunities that don't use chemicals that can also reduce scale build up and corrosion. Some of these are listed in your Learner's Guide, so you can get some more information.

Automation and controls can be key. This is where certain particular parameters are monitored so that blow down can be reduced. A lot of systems blow down too much water that isn't necessary. If you can have good automation and controls you can minimize how much is blown down which would, again, minimize your make up water. We'll be getting into the reuse systems here in just a little bit.

Single pass cooling is another huge user of water. I've listed several pieces of equipment for you to look for in your walk-through audit.

This jumps back a little bit to Step 2. One of the things I want to note here is that the picture in this slide is an ENERGY STAR ice machine. I mentioned that a couple slides ago. This is an air cooled machine; you can tell by the louvers on the side, it's similar to your refrigerator. When you're doing your walk-through audit and you see an ice machine that has the louvers on the side you know it's not water cooled, it's an air cooled machine. But keep your eye out for these single pass cooling equipment.

Labs can be a huge user of water, too, lab and medical equipment. One in particular I want to talk about is sterilizers. Sterilizers, similar to the boiled-based steamers, send steam to the drain that has to be tempered, and there's retrofit kits that are now available that you can put on an old sterilizer that can limit the amount of tempering that's needed by monitoring the exact temperature and only supplying the amount of tempering water that's needed.

I want to get into water reuse quickly here. Water reuse is important, again, because the executive order encourages all Federal agencies to reuse water. So I want to define it really quickly.

Water can be reused three main ways. Recycled is when you use it in one process; like a vehicle wash station, you take the last rinse cycle and use it in the next vehicle water pre-rinse. Industrial reuse is where you don't treat the water from one application and then you use it in another application. I'll give an example of that in a second. Wastewater reclaim is where you take treated effluent and use it in another application. Those are the three main categories.

Where are you going to find this water? Where do you get this water reuse? Well, the listing here on the bottom of your slide gives you some examples. Effluent from a wastewater treatment plant, gray water – which is defined as water that comes from uses inside a building, mainly sinks, showers, sometimes laundry. But it's water that doesn't have too many contaminants in it that can be used again.

Condensate capture, I'm going to be giving an example of that in a second and reject water from a purification system, like an RO system which I'm also going to be giving a case study here in a second.

Now we understand what water reuse is in general, we understand some of those sources of that water, but where are you going to use the water?

Here are some examples of where that water can be used. There are some great gray water package units now on the market. You remember that incredible source of information I told you about, The Alliance for Water Efficiency? They have a link that talks all about gray water package units and these systems are great for folks that want to have a cradle to grave solution. It's like a one stop shop for being able to reuse your gray water.

Vehicle wash stations are a great place to recycle water. Laundry can also have recycling components to it. Cooling tower make up is a great way to reuse water from another application like RO reject. Toilets and urinals can be flushed with gray water, or other sources of this reused water.

Ft. Carson has a wastewater treatment plant onsite and they reuse their wastewater treatment to water their golf course. That's a really good example of water reuse and there's a case study written about this program on the FEMP website.

Another case study that's on the FEMP website is Sandia National Laboratories microelectronic plant. It is an incredible program that has looked at a lot of different applications and reduced their water use by over 140 million gallons a year, which is incredible. They have a HERO system, which stands for High Efficiency Reverse Osmosis. And this HERO system has a very high recovery rate.

Some RO systems have a 60 percent recovery rate – but it's about 90 percent at Sandia National Lab. They recycle some of that water back through their RO system, so they're doing recycling, but they're also doing reuse because they reuse the reject water that isn't clean enough to go back through the system – and they use it in a nearby cooling tower. They pump it over to a storage tank and reuse it.

It's an incredible system where they've reduced their demand and then they've recycled some of that water in their system and they're also reusing the reject. So it's a great example of looking at it from different angles. Also the EPA has a condensate capture program where they take condensate from air handling units in hot, humid climates and pipe it to nearby cooling towers. There's a case study written on a specific site in Athens, Georgia – and they have saved a lot of water in this program.

And again, it's out on the website to read more about that. Leak detection is an important area for your water management plan that's often forgotten. Leak detection is one of those things sight unseen. If you don't see it leaking, you're not going to be thinking about it. I have some resources listed for you in this slide. But the key to leak detection is listening for the leak.

It's often contracted out to outside consultants or contractors because it is specified equipment and specified training. It can be done in-house and it's a really important step in the whole management process. It can be done, actually, in step two. Step 2 really understands what your whole water use would be including your leaks.

There's a very successful leak detection program, in fact award winning – at Kirtland Air Force Base in Albuquerque, New Mexico. This picture shows a leak that was leaking out 150 gallons per minute. They saved 16 percent in this project alone for their entire water use. It was highly successful. So you might want to read the case study and get some ideas for your own site.

We have so many nice ideas but how are we going to pay for all this stuff? Well, you might be surprised – there's a lot of money out there for water projects that you may not know about. If

you're a DOD site, I have several options listed of pots of money that you might be able to get a lot of water efficient funding for.

I also want to mention that because water bridges not the environmental section or environmental aspect of the operations of a facility, look at pollution prevention. I'm going to give you a quick example. Do you remember Pacific Northwest National Lab, how we had a huge amount of water being used in our single pass cooling equipment?

Well, we got some funds to close loops on some of those systems through our pollution prevention program because the city of Richland was threatening to take our discharge permit away because we were dumping too much fresh, clean water into the wastewater treatment plant. It was messing up their ratio in their treatment plant.

We were able to get a lot of the single pass cooling systems closed because of the risk of losing our discharge permit, which fell into the pollution prevention program. Make sure that you look outside the box. Don't just stay in your energy program, but look for other areas that you might be able to find money.

ESPCs and UESCs allow for water measures to be combined and bundled. It can be great to combine them with lower payback projects that you might find with energy. Also look for utility rebates. Water utilities across the country are providing rebates. They can do free auditing and it can be a great source of additional money for your project. WaterSense has a wonderful rebate finder site on their website so if you go to the water sense website and find the rebate finder website, it's actually a U.S. map and you can click on your state and find your rebates in your area. That's a great piece of information.

The last step is what you do if you have some type of emergency or you have a drought in your area that you need to plan for. Well, this is all about proactive planning. Drought management planning is planning for future drought, not being blindsided by a drought.

I don't have time to talk about drought management planning today, but what I do want to emphasize is that you aren't immune to drought, no matter where you live in the country. This map is the droughts in the U.S. The darker the color, the worse the drought. The yellow areas are abnormally dry and any shade brown or darker is a drought. This shows that the west is in pretty bad shape, and this was as of February of this year.

If we go back to the summer, this shows Texas and some of the northern part of the country in pretty bad shape as well as California. If we go a year previous, look at the southeast. Do you all remember the horrible drought the southeast had during this time? I'm sure we all do here in Tennessee.

This just shows that drought can hit anywhere. There are some good resources in your learner's guide that talks about drought management planning that can help get you started on what to do for a proactive plan for contingencies.

I've talked about the WaterSense program a lot today, The Alliance for Water Efficiency, American Waterworks Association – I haven't mentioned them much, but they are an incredible source of information. They have a great manual on leak detection and distribution system audits. I highly recommend it. The California Urban Water Conservation Council is also an incredible source of information.

I just hope that today I was able to provide a nice foundation so that you can start – one step at a time – planning your water management program to meet your efficiency goals and reduce your water use at your location.

Kathy Hyland:

Thanks, Kate

Kate McMordie Stoughton:

Thank you.

**FEMP First Thursday Seminar:
Water Efficiency Planning and Reporting; April 1, 2010**

Kathy Hyland: We do have some questions already.

Kate McMordie Stoughton: Okay, great.

Kathy Hyland: This first question is how would ILA reduction be demonstrated if related water use was not previously metered?

Kate McMordie Stoughton: Well, at the Pacific Northwest National Lab, we're developing a tool to help estimate un-metered uses in the ILA category. If we can estimate your current use, there is a way to demonstrate reduction based on efficiency improvements based on typical results. But I think the crux of this question is that one thing that's really important is you have to start metering.

There has to be a metering plan put together on your big water users that are in this new ILA category so that you can start measuring it. If that's not a possibility, if you absolutely cannot meter your industrial, landscaping or agricultural water use, there are ways to estimate your current use and then ways to demonstrate that you've reduced that use and that's what would be reported to your agency.

That would then be rolled up in the agency reporting. Again, in PNNL, Pacific Northwest National Laboratory, we're putting together a tool to help do this. Hopefully in the next few months you're going to have some resources for that.

Kathy Hyland: Okay, good. This question comes surrounds the audit. In the audit you did, did you sub-meter the branches, and also, how long does a typical audit take? Will - Do you want first or let Kate?

Will Lintner: Well, why don't you tell a little bit about what you did at Y-12 and how long that took? It took a little bit of while.

Kate McMordie Stoughton: Yes, in fact we're still in the middle of it. For a large plant, and again, kind of depending on your overall goals, a water audit can take weeks. The question about sub metering or putting a temporary meter on an application is an excellent question and an excellent point that I didn't mention in my presentation today. It is a very common practice.

You can put an ultrasonic meter, it's a strap on meter that can be put on the outside of a pipe, you don't have to disrupt the flow at all. And it's usually done over a week time period, if you can. If you can get that type of timeframe it can really show you your water use trends over that time period.

A water audit – again, depending on how big your facility is – can take weeks to go through all your facilities to really get a feel for your water use. Now if you have just a few buildings, then that would take obviously a lot less.

Kathy Hyland: We have a live question from Wilmington, Illinois. My question is simple, is there any free help where you dispense an expert or consultant that would come?

Kate McMordie Stoughton: Free? I don't think it's free

Will Lintner: Yeah, I'll answer that. We have limited help to Federal agencies to do some onsite water audits. When we do these audits, we generally like to do audits that are challenging and that will also help move our – basically the state – the arc forward when we do audits.

We will provide Federal agencies with resources where they can go get their own audits. There are audit resources that can be attained from the GSA schedule and other sources. So those are the sources that we have for help for Federal agencies.

Kathy Hyland: All right. Next question I have is, "If I use non-potable water onsite that does not meet any of the definitions of industrial, landscaping or agricultural water, do I have to report it?"

**FEMP First Thursday Seminar:
Water Efficiency Planning and Reporting; April 1, 2010**

- Will Lintner:* The intent, basically, of these executive orders, is to capture all the water use at the sites. If you don't have it in your potable water baseline, you probably should have it in the ILA baseline.
- Kathy Hyland:* Okay great.
- Kate McMordie Stoughton:* Can I add something?
- Kathy Hyland:* Yes.
- Kate McMordie Stoughton:* There may be some uses that don't fall into that ILA, or the industrial, landscape, agricultural that we have seen. I think Will's point is really important that most of your water use, if it is consumed in your facility, in your equipment, it's probably going to fall under one of those. Just make sure that you understand the definitions and that you look closely at your water use.
- This is where this management planning comes in handy. And the guidances for this executive order should be coming out soon – it's going to provide a good interpretation of this executive order.
- Kathy Hyland:* Okay, great. Kate, this question kind of relates to something I know you wanted to talk about. Is there any training available in water efficiency? It's kind of a new thing for folks.
- Kate McMordie Stoughton:* Yeah, it's really exciting, actually. There's a new training that has just been posted very recently. It's a comprehensive training in water management. It's actually similar to what we've done today, except it goes into more detail. It's on the FEMP website through this FEMPtraining.labworks.org site.
- It is a web based self-paced training. You can take it at any time you want and it takes you through the basic steps of management planning for water and goes into specific equipment efficiency opportunities as well.
- Kathy Hyland:* Great. Okay another one. With the low cost of water on our side, how are we supposed to pay for water efficiency projects?
- Will Lintner:* That's a continual problem and not only for water, but also for energy where it's low cost. One of the things that we've tried to do is bundle water and energy projects together with our energy savings performance contracts.
- One of the things that I would look first to is try to do something like that where you can bundle the water project with the energy projects especially if there's an energy aspect of the water. Most of the time there is because pumping the water takes energy and sometimes a significant amount of energy.
- Kathy Hyland:* Great. Kate, do you have anything to add to that one?
- Kate McMordie Stoughton:* Well, I think one thing I want to add and that I've seen specifically at some Federal sites is that if you can get a good feel for where your biggest opportunities are, then you can develop good economics. You can't prove a project until you know for sure what your economics are. The planning process is really crucial in developing an overall strategy.
- Doing little bits at a time – taking little steps – I've seen, for example, Marshall Space Flight Center, a NASA site has done that very well. They take little chunks and they build a program based on those little steps. Before you know it, they've done a lot of work. If you just take it a little bit at a time that can help.
- Kathy Hyland:* Great. I've got another question here. Does there come a point where it is no longer practical to ask a site to conserve water?

**FEMP First Thursday Seminar:
Water Efficiency Planning and Reporting; April 1, 2010**

- Will Lintner:* Well, I would say that, yes, there does come a time when you can't save water anymore, where you basically would get back to a minimum amount of water. One of the things you have to look at besides cost effectiveness is what other synergies are out there? Do you have environmental restraints – for one thing – on water discharge?
- We've talked a little bit about that but that can be a very important motivator for saving water. When we run into drought conditions, again, that's a very important motivator for saving water. So there probably is a point where we won't be able to save water anymore, but we're a long way from there.
- Kathy Hyland:* We have another live question. Does storm water used for irrigation need to be metered as well?
- Kate McMordie Stoughton:* Does it need to be metered?
- Bob Buchanan:* Yeah.
- Kate McMordie Stoughton:* Well, there isn't a requirement necessarily for metering that type of use. It may not be a bad idea, but there isn't a requirement. The executive order doesn't talk about – nor does any other state of policy require metering for water.
- The question might be, do I have to include that in the industrial, landscaping, agricultural water category. No – you don't have to track. If you're using storm water for your irrigation – are you retaining it on site?
- Caller:* Right.
- Kate McMordie Stoughton:* Yeah, no, that would be considered water reuse.
- Will Lintner:* Um-hum.
- Caller:* Right but it would probably be a good idea to track it so you could see how much water you didn't use.
- Kate McMordie Stoughton:* Absolutely. But there isn't a necessary requirement. Will, did I state that right?
- Will Lintner:* Right, that's correct. There are guidelines for storm water that were put out under the executive order already under EPA. Those guidelines are already out and on the website. Take a good look at those requirements. But there's nothing to basically say that you should be metering storm water.
- Kathy Hyland:* Okay. That's all the time we have for questions, so thanks to Kate and Will. As we've mentioned, this is a series of seminars, there are three more yet to come.
- We want to strongly encourage you to complete a seminar evaluation and a short quiz. The evaluation will be used to improve our future offerings and the quiz will help reinforce your learning. If you complete the quiz and the evaluation, you can print out a certificate of course completion for your records.
- I want to thank Kate and Will for their time today. I would like to thank PNNL for making Kate available to us for her preparation and for conducting the instruction. I'd like to thank the Federal Energy Management Program for hosting these seminars.

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